

**PERFORMANCE MONITORING BASED DYNAMIC VOLTAGE AND
FREQUENCY SCALING**

Abstract

Voltage and frequency scaling techniques that are based upon
5 monitored data are provided. The techniques may be used to better manage
the power and energy consumption of a processor in an embedded system,
such as a cellular telephone, personal data assistant, smart device, or the
like. The techniques may be used with processors that offer a performance
monitoring capability. The performance monitor may monitor thread-level
10 utilization at runtime. Instructions per cycle and memory references per cycle
are example metrics that may be monitored by the performance monitor. The
voltage and frequency scaling techniques may adjust the operating voltage
and operating frequency of the processor based on the values of these two
metrics. For example, the techniques may include accessing a voltage and
15 frequency scheduler lookup table. The techniques may be employed with
non-embedded systems, as well, embedded systems.